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EXAMINER
SHERRERD, [illegible]

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Paper No. 19

Serial Number: 08/309,868
Filing Date: 09/21/94
Appellant(s): HIDENARI YASUI, and MASAHIDE SHIBATA

Terryance F. Chapman
For Appellant

EXAMINER'S ANSWER

This is in response to Appellant's brief on appeal filed 01/16/98.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims.*

The statement of the status of claims contained in the brief is correct.

(4) *Status of Amendments After Final.*

The Appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

Appellant's summary of the invention is accurate.

(6) *Issues.*

The Appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The rejection of claims 2 to 5, 11 and 12 stand or fall together because Appellant's brief does not include a statement that this grouping of claims does stand or fall together.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

5,215,554	Kramer et al.	01-1996 (patented)	05-1992(filed)
5,362,395	Dorau et al.	11-1994 (patented)	03-1992 (filed)
5,484,549	Hei et al.	05-1996 (patented)	09-1993 (filed)
5,520,888	Berndt	06-1993	

T.D. Brock, Biology of Microorganisms, Prentice Hall, 1970, pp. 214 and 215.

(10) Grounds of Rejection

Claims 2, 5, 11 and 12 are rejected under 35 U.S.C. § 103 as being unpatentable over Dorau et al. (U.S. Pat. No. 5,362,395) in view of Hei et al. (U.S. Pat. No. 5,484,549) or Berndt (U.S. Pat. No. 5,520,888) or Kramer et al. (U.S. Pat. No. 5,215,554).

Dorau et al. teach, as shown in the drawing, the biological purification of sewage, whereby sewage (1) and air (4) flow into a bioreactor (10) after which it sent through an ultrafilter

membrane (9) and then sent to a filtrate basin (15/1). From there, the treated sewage is sent to a reactor basin (31) and ozone (40) is introduced into the sewage stream. In the reactor basin, chemicals (34) "for the chemical or physical treatment of the concentrate can be supplied." (Col. 10, lines 35 to 45). The stream then flows back into the bioreactor (10) to complete the recycle loop. (See Figure). While Dorau et al. teach the addition of chemicals to the sewage at the reactor basin, they do not specify the scope of what chemicals would be added. Therefore, there is no mention of the addition of acid to adjust the pH into the range claimed by Appellants nor is there any mention as to what the pH value might be.

Hei et al. and Berndt and Kramer all teach the effects of pH on the solubility of ozone in an aqueous solution.

Hei et al. teach, at col. 3, lines 38 to 53, the "low solubility and instability of ozone . . . is substantially enhanced as the pH increases past 6."

Berndt teaches, at col. 4, lines 48 to 60, the well known effect of pH on the solubility of ozone.

Kramer et al. teach, at col. 41, lines 14 to 30, the well known adverse effects of high pH's on ozone stability.

It would have been obvious to one of ordinary skill in the art to add chemicals, such as those taught by Hei et al., Berndt

and Kramer et al., to modify the pH of Dorau et al. because Hei et al., Berndt and Kramer et al. all teach that high pH's adversely affect the stability and solubility of ozone.

It is considered that Appellants have merely employed well known waste processing technology in conjunction with routine optimization and obtained the expected results. Specifically, it is considered that Appellants have optimized the pH and temperature to obtain the desired final solids level.

Claim 3 is rejected under 35 U.S.C. § 103 as being unpatentable over Dorau et al. (U.S. Pat. No. 5,362,395) in view of Hei et al. (U.S. Pat. No. 5,484,549) or Berndt (U.S. Pat. No. 5,520,888) or Kramer et al. (U.S. Pat. No. 5,215,554) and in further view of Brock (Biology of Microorganisms, pp. 214 and 215).

Dorau et al. in view of Hei et al. or Berndt or Kramer et al. teach that which is cited above but do not disclose lowering the pH by acidogenesis.

Brock broadly discloses the well known effect of microorganisms on the pH. One example of man's use of this pH-lowering-effect by anaerobic fermentation is in the production of pickles (page 215) "by allowing acidity to develop directly in the food through microbial action.

It would have been obvious to one of ordinary skill in the art Dorau et al. in view of Hei et al. or Berndt or Kramer et al. and in further view of Brock since it well known to utilize organisms to lower a solution's pH and thereby optimize the use of ozone.

Claim 4 is rejected under 35 U.S.C. § 103 as being unpatentable over Dorau et al. (U.S. Pat. No. 5,362,395) in view of Hei et al. (U.S. Pat. No. 5,484,549) or Berndt (U.S. Pat. No. 5,520,888) or Kramer et al. (U.S. Pat. No. 5,215,554) and in further view of Brock (Biology of Microorganisms pp. 202 to 204).

Dorau et al. in view of Hei et al. or Berndt or Kramer et al. teach that which is cited above but do not disclose the heating of the system fluids.

Brock broadly discloses the well known effect of temperatures on thermophilic microorganisms. Specifically, thermophiles grow at temperatures of 50°C and higher. An example of a thermophile environment is that of a compost pile whose temperatures "usually reach 60 to 65°C" (page 204, top).

It would have been obvious to one of ordinary skill in the art Dorau et al. in view of Hei et al. or Berndt or Kramer et al. and in further view of Brock since it well known that decomposing organisms operate at higher temperatures.

(11) Response to argument

Appellants first argue that the primary reference Dorau et al "does not show (1) the removal of a portion of an aerated aqueous suspension from the aeration tank, ozone treatment of the aerated aqueous suspensions and the returning of the ozonized aerated aqueous suspension back to the aeration tank or (2) performing ozone treatment on part of the sludge formed from the subjection of the aerated aqueous suspension to solid/liquid separation and the returning of the ozonized part of the concentrated sludge back to the aeration tank for further aerobic biological treatment."

The Examiner strongly disagrees. As set forth in the rejection above, Dorau et al teach all the process steps that Appellants assert are missing. Specifically, Dorau et al. teach the removal of a portion of an aerated aqueous suspension from the aeration tank, ozone treatment of the aerated aqueous suspensions and the returning of the ozonized aerated aqueous suspension back to the aeration tank. Further, Appellants have not set forth what specific steps are missing. It is considered that Appellants have presented broad claims and that those claims are taught by the prior art.

Appellants state that the "inventive feature of the present invention resides in the reduction of the amount of excess sludge generated during an aerobic biological treatment process" and that "[t]hese [claimed] steps enable the reduction of excess sludge generated in the aerobic biological treatment process." It is noted that the instant claims are silent as to the stated "reduction of the amount of excess sludge" and therefore any argument based on said reduction of excess sludge is not considered persuasive.

If Appellants are asserting that the reduction of the amount of excess sludge is indicia of unexpected results, then this should be put on the record as such. But rather, it appears from Appellants' statements that they are asserting that the Examiner has not met his burden in providing a *prima facie* case of obviousness.

If, in the alternative, Appellants are in fact stating that said reduction provides for unexpected results, and therefore that the Examiner has established a *prima facie* case, a comparison of the cited art should be presented in the form of an 1.132 affidavit/declaration.

Appellants appear to argue that "when the pH is adjusted to be between 3 and 5 prior to the ozone treatment, a much lower

amount of ozone is needed to accomplish the desired oxidation" and that "[t]his is clearly unexpected in the light of the disclosure of Dorau et al and the secondary references cited" (page 6 of brief). First, only claim 3 requires that the ph be adjusted (and only to a pH of "5 or lower") before the ozonation step. Second, the secondary references provides ample evidence that those in the art are well informed as to the effects of a low pH on the effectiveness of ozone.

Appellants argue specifically that "[t]he fact that ozone may be more unstable at higher pHs has no correlation at all with respect to the reaction efficiency of ozone at the presently claimed pH range." In fact, as cited above, Hei et al. teach, at col. 3, lines 38 to 53, the "low solubility and instability of ozone . . . is substantially enhanced as the pH increases past 6." This teaching a directive to keep the pH at below 6 and this would include a range of below 5. It is considered that those in the prior art would clearly recognize that the pH range at which ozone is used is a result effective variable, i.e., the lower the ph the more effective the ozone, and therefore this variable would be optimized accordingly. The courts have held that optimization of result effective processes parameters is well

within the skill of those in the art. *See In re Boesch*, 205 USPQ 215 (1980).

Berndt and Kramer et al. teach much the same as Hei et al. and therefore the secondary references clearly teach that those in the art need to maintain the pH at a selected low pH to maintain the effectiveness of ozone.

Appellants argue that, with respect to the teachings of the Brock reference, that "since the present invention is not dealing with anaerobic fermentation, Appellants are hard-pressed to see how this reference is relevant to the presently claimed invention." The Examiner is confused by this argument, because the rejected claim (claim 3) clearly requires that the suspension or sludge "is subjected to an anaerobic biological treatment to adjust the pH thereof to a value of 5 or lower." Therefore, the Examiner is at a loss to see why Appellants do not find the Brock reference extremely pertinent to the claimed invention.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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March 18, 1998

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